Management accounting adaptability in an integrated information system environment

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Abstract

In this study, we explore the relationship between the qualities of the information system environment and management accounting adaptability. The information system environment refers to three distinct elements: the degree of information system integration, system flexibility, and shared knowledge between business unit managers and the IT function. We draw on the literature on integrated information systems (IIS) and management accounting change and propose a model to test the hypothesized relationships. The sample for this study consists of Australian companies from all industries.

1. Background

Support for management accounting is provided by solutions such as Enterprise Resource Planning Systems (ERPS) and budgeting software (Granlund and Malmi, 2002, Rom and Rohde, 2007). ERPS' provide easy and fast access to operational data which in turn affect the ability of management accounting to provide managerially relevant and usable information (Cooper and Kaplan, 1998). ERPS' are also known as IIS, since the software in itself or when used in conjunction with other software (e.g. business intelligence solutions) is *integrated* in the sense that data are stored in one place and computers can communicate with one another through a shared network (Rom and Rohde, 2007).

There exists a considerable amount of research on IIS which started to emerge in the late 90's, in parallel to large-scale software implementations in the industry. Much of this earlier research focused on the impact of ERPS on corporate performance (e.g. Poston and Grabski, 2000, Hunton et al., 2003, Nicolaou, 2004, Nicolaou and Bhattacharya, 2006). Although, the initial findings were not highly supportive in terms of the impact of ERPS on organizational financial performance, more recent studies found an indirect relationship between the two through improvements in business processes (e.g. Wieder et al., 2006, Velcu, 2010).

Researchers have also looked at the relationship between IIS and management accounting or control (e.g. Granlund and Malmi, 2002, Scapens and Jazayeri, 2003, Rom and Rohde, 2007, Chapman and Kihn, 2009, Wagner et al., 2011). Often, this relationship is considered unidirectional, i.e. that IIS impacts management accounting (Rom and Rohde, 2007), as difficulties of changing ERPS forces companies to work with initial configurations and failures (Davenport, 1998, Dechow and Mouritsen, 2005). This would suggest that the adoption of new management accounting techniques would become difficult once a system is in place. On the other hand Rom and Rohde (2007) claim that

there may be a bidirectional relationship between IIS and management accounting. Rom and Rohde (2007) argue that users can reconfigure the systems incrementally, leading to significant changes over time. Quattrone and Hopper (2006) illustrates a case where such reconfigurations lasted for four years, leading to a continuous state of drift. Wagner et al. (2011) also reports on a post-roll-out modification but in this case, the ERPS was reconfigured to match the functionality of the legacy systems for its grant accounting module. Overall, research focusing on the adoption of IIS found that ERPS implementations had no significant effect on management accounting techniques (Scapens and Jazayeri, 2003). In contrary, it is suggested that ERPS might have a stabilising effect on management accounting practice (Granlund and Malmi, 2002).

Despite the advent of IIS and its profound impact on the way processes are executed, an earlier study reported that companies continue to use separate spreadsheets or software for Balanced Scorecards (Kaplan and Norton, 1992) and Activity Based Costing (Cooper and Kaplan, 1991). These software programs are more user-friendly and flexible with regards to analysis and reporting (Granlund and Malmi, 2002).

ERPS' have significantly evolved since their inception with the development of new software paradigms such as Service-Oriented Architecture and Cloud Computing offering improved analytical capabilities than before. However the same question remains: once the software is implemented, how does it impact management accounting? Does it facilitate or hinder change?

Contingency theory suggests that management accounting practices in organizations reflect the idiosyncratic circumstances internal and external to the firm (Burns and Stalker, 1961, Lawrence and Lorsch, 1986). One of the earliest adopters of contingency theory in management accounting research is Hofstede (1967), who explained the functioning of the budgeting system through economic, technological, and sociological factors. Consistent with this theory, also management accounting change was found to be associated with global competition and changes in technology (Waweru et al., 2004), the performance gap (Jun Lin and Yu, 2002), organizational structure (Cavalluzzo and Ittner, 2004, Abernethy and Bouwens, 2005), top management support (Cavalluzzo and Ittner, 2004), and the influence of government (Lapsley and Wright, 2004). There is also evidence that the type of strategy may have an impact on the use of management accounting techniques. For example, with the differentiation strategy, companies tend to use advanced management accounting practices such as quality improvement programs, benchmarking, and activity-based management (Baines and Langfield-Smith, 2003). Also Fullerton et al. (2012) report that companies with lean manufacturing strategies adopt different types of management accounting and control techniques. Given that contingent factors are likely to change over time, management

accounting adaptability becomes critical to sustain the fit. However, barriers to change exist, with IIS being possibly one of them (Rom and Rohde, 2007).

Management accounting change may be supported (or limited) by the flexibility (inflexibility) of the information technology architecture of a company. Flexibility has been recognized as an important element of an organizations' IT infrastructure (Byrd and Turner, 2000). Davenport and Linder (1994) view IT infrastructure flexibility as a core competency and that IT infrastructure should enable change to be able to effectively respond to new market conditions. IT infrastructure as a concept can be divided into two related components: a technical IT infrastructure and a human IT infrastructure (Henderson and Venkatraman, 1992). The technical IT infrastructure entails the integration and interconnectedness of telecommunications, computers, software, and data so that all type of information can be expeditiously and effortlessly routed through the network and processes (Rockart et al., 1996). The human IT infrastructure refers to human and organizational skill, expertise, competencies, knowledge, commitments, values, norms, and organizational structures (Henderson and Venkatraman, 1992, Henderson and Venkatraman, 1993, Broadbent and Weill, 1997, Broadbent et al., 1999). Gebauer and Schober (2006) define information system flexibility in terms of the flexibility-to-use and the flexibility-to-change the system. Flexibility-to-use refers to the range of process requirements met without requiring a major change to the IS. On the other hand, flexibility-to-change refers to the degree to which a system can be changed in the future (Gebauer and Schober, 2006).

In-depth knowledge of technologies, processes, and people in and across diverse functional areas is recognized as drivers of organizational performance (Badaracco Jr, 1990). This is also true for the IS group's ability to effectively work with diverse functional groups (Rockart and Short, 1991). This relationship has only intensified over the recent years as business processes have become more embedded in technologies such as ERPS. Thus line management today is heavily dependent on the IS group for technical support and for changes required to the existing systems. This can only be accomplished through *shared knowledge*, which is defined as an understanding and appreciation among IS and line managers for the technologies and processes that affect their mutual performance (Nelson and Cooprider, 1996).

This study does not focus on change per se, as change is not the end but instead views *adaptability* as an important capability that can allow for changes to management accounting when necessary, i.e. when internal or external conditions change. For example, organizations might decide to switch to Activity Based Costing or incorporate some additional key performance indicators into their scorecards/dashboards. Hence, the level of management accounting adaptability would determine

the extent of such modifications. This could be considered a capability since it is known that companies capable of changing their management accounting practices are more likely to outperform companies that are more static (Baines and Langfield-Smith, 2003).

According to the Resource Based View of the firm, capabilities refer to an organization's ability to assemble, integrate, and deploy valued resources to achieve competitive advantage (Russo and Fouts, 1997). Resources include tangible, personnel-based, and intangible resources (Grant, 1991). Physical assets such as plant, equipment, and inventory are examples of tangible resources. Intangible resources refer to reputation, brand image, customers, and information systems. The focus of this paper is the information system and its characteristics (degree of integration and flexibility). Personnel-based resources include technical know-how, organizational culture, training, and loyalty. Shared knowledge as well as the skills and attitudes of the IT function fall under this category. The characteristics of the information systems with those of the personnel (personnel-based factors) make up the Information system environment.

An adaptable management accounting system can improve the effectiveness of the management accounting function. Adaptability is necessary since the environment in which organizations operate constantly change. It is known that changes in technologies, market conditions, organizational style, and strategy can lead to changes in management accounting practices (Baines and Langfield-Smith, 2003). A lack of adaptability in the light of such changes may result in management accounting systems that are no longer relevant. They may lack the capability to provide information for decision making and control. Hence, an adaptable management accounting system is likely to be more effective than a system which is relatively static. Finally, an effective management accounting system would lead to enhanced organizational performance.

2. Hypotheses Development

Integration is a key feature of modern information systems such as ERPS. Probably, the most defining characteristic of integration is the singe database concept. Chapman and Kihn (2009) reported that integration in terms of a common data architecture improves performance through enabling repair, internal-, global transparency, and flexibility. These four design characteristics are derived from Adler and Borys (1996) and facilitate an *enabling* approach to management control. Repair refers to a situation where the user can deal with uncertainties to avoid a breakdown in the process. This may be supported by an IIS if the system allows for some user modifications to the reporting or if the users can drill down information (see operationalization in Chapman and Kihn, 2009). This design feature is desirable so that users can better deal with unforeseen circumstances.

This feature is related to flexibility since modifications to the interface or features need to be made to suit the specific work demands of individuals (Adler and Borys, 1996). An IIS can support this feature as it allows some configuration through constrained user options (Chapman and Kihn, 2009). Flexibility in this context refers to flexibility-to-use but not to flexibility-to-change (Gebauer and Schober, 2006). Flexibility-to-change the system is equally important and needs to be considered as not all required changes to management accounting can be made through user changes. Some changes might require intervention from the IT function, e.g. reprogramming. Given the importance of flexibility in facilitating change, we posit the following hypothesis.

H1: Information system flexibility is positively related to management accounting adaptability

The second design characteristic *internal transparency* refers to an IIS' ability to provide an "excellent platform for the development of a control system that can inform its users in detail concerning the inner workings it acts upon" (Chapman and Kihn, 2009 p. 155). This feature might also relate to management accounting adaptability in the sense that integration might on one hand increase complexity, making changes to system difficult but on the other hand support adaptability by highlighting weaknesses in current reporting practices. This leads to our second hypothesis.

H2: Information systems integration is related to management accounting adaptability.

Global transparency may also be supported by an IIS through its extensive process mapping and standardization efforts, allowing its users to see how local actions impact larger organizational goals and strategies, as well as by allowing interaction between previously distant individuals (Chapman and Kihn, 2009). When it comes to adaptability, we think that the interaction between the IT function and managers is critical. Major changes to the system can only be made through the support of the IT function. This leads to our third hypothesis.

H3: Shared knowledge between IT and accounting is positively related to management accounting adaptability.

We also hypothesise a negative relationship between IIS and flexibility as integration might increase complexity, making the system potentially more difficult and or costly to change. On the other hand, we argue there is a positive relation between IIS and shared knowledge between IT and managers since in an IIS environment, reliance on the IT function is likely to be more prominent because of the complexity and interconnectedness of the system.

H4: Information systems integration is negatively related to information system flexibility.

H5: Information systems integration is positively related to shared knowledge between IT and business unit managers.

We also posit that a highly adaptable management accounting system is more likely to provide a better fit, resulting in a more effective management accounting system than one that is less adaptable. Effectiveness relates to the adequacy of the management accounting system in providing the required decision relevant information to management. It would also facilitate the desired level of control by collecting and communicating the required information. This leads to Hypothesis 6.

H6: Management accounting adaptability is positively related to management accounting effectiveness.

Finally, we expect a more effective management accounting system to lead to better organizational performance as managers can improve planning and control through the access to better tools and more relevant information (Baines and Langfield-Smith, 2003, Chapman and Kihn, 2009). This leads to our final hypothesis.

H7: Management accounting effectiveness is positively related to organizational performance.

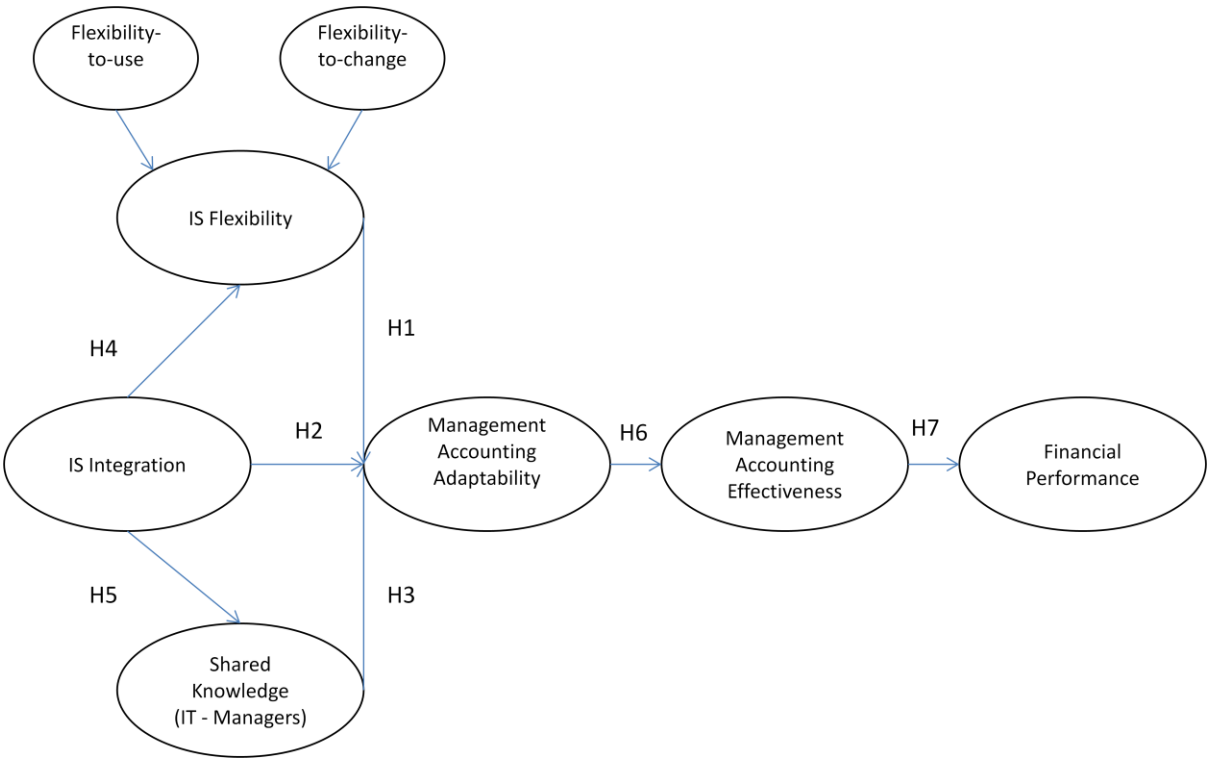

Figure 1: Research Model

3. Research Design

Data and Method

The sample for the survey will consist of Australian companies. We will not limit the sample to any particular industry or sector, although one constraint will apply to turnover (minimum $1 million). The respondents will be business unit or line managers as in relevant studies (e.g. Baines and Langfield-Smith, 2003, Chapman and Kihn, 2009). The survey will be e-mailed to 4,000 respondents with an aim of receiving more than 200 valid responses. We will use factor analysis to test the internal consistency of the (reflective) constructs and correlation analysis and Partial Least Squares Modelling to test the hypothesised relationships between the constructs in the model.

Measures

All measures have a minimum of three indicators. The IS integration measure is based on Chapman and Kihn (2009) and focuses on the common database concept, the most prominent feature of the IIS. IS flexibility is a second order construct and captures both, flexibility-to-use (FTS) and flexibility-to/change (FTC) and is derived from Gebauer and Schober (2006). The two constructs (FTU and FTC) are considered to be formative in the sense that the items within each construct are not expected to correlate and therefore form rather than reflect the respective constructs. Shared knowledge between the IT function and management is based on Elbashir et al. (2011). Management accounting adaptability and management accounting effectiveness are measures developed by the authors. Finally, performance is based on Govindarajan (1984) and Govindarajan and Fisher (1990).

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